Coronal epenthesis and markedness
Linda Lombardi
University of Maryland, College Park
LL57@umail.umd.edu

1. Introduction
It has been argued that Coronal shows a number of properties that suggest it is the unmarked place of articulation, and that therefore coronals should be represented as Placeless. (See especially Paradis and Prunet 1991). One type of evidence for this has been the claim that coronals are common epenthetic segments. The underspecification approach to coronal unmarkedness has a number of problems (see McCarthy and Taub (1993) for additional examples). In the case of epenthesis, coronal placelessness runs into difficulties when it comes up against another common claim: that glottal stop is the most common epenthetic segment, and that it is placeless. It is clear that both types of segment can’t be placeless, since we often must be able to distinguish them within a language. And the empirical support given for epenthetic coronals has been weak, often based on only the single case of Axininca Campa.

In this paper I will show that we do find coronal epenthesis, but only in special circumstances where there is some way to force the more marked coronal to be epenthetic instead of the less marked glottal stop. The use of universally ranked Place feature markedness constraints as originally proposed by Prince and Smolensky (1993), Smolensky (1993) will be crucial in the analysis; I will show how they can be extended to handle both Coronals and glottals appropriately.

2. Laryngeal unmarkedness: the master consonant

“Phonetically, the glottal stop, unreleased, is the negation of all sound whether vocalic or consonantal. Is it the perfect minimum or terminus of the syllable, the beginning and the end, the master or maximum consonant?”
F.R. Palmer 1948

Smolensky (1993) shows how we can get epenthesis of unmarked Coronals without underspecification by use of the universally ranked hierarchy in (1):

(1) *Lab, *Dor >> *Cor

In (2), “Epenthesis” abbreviates the constraint hierarchy that makes consonant insertion the optimal resolution of hiatus.
As we see in this tableau, once the only surviving candidates are those with some epenthetic consonant, the markedness constraints pick the consonant with the least marked Place. This allows us to analyze the unmarked behavior of the coronal without recourse to underspecification. The /t/ does have Place, and in fact it does violate a Place markedness constraint. But because its markedness violation is the lowest ranked one out of all the choices, it will be optimal.

This is an important proposal and a profound insight, but there is one small empirical problem, which is that /t/ is not the most common epenthetic consonant; in fact the optimal epenthetic consonant in most cases is not a coronal at all. As is well known, it is glottal stop.

In Lombardi (1996) I propose to account for the unmarked behavior of glottal stop by extending the Place markedness hierarchy. I assume that glottal stop has Pharyngeal place, following the representations in McCarthy (1989):

\[(3) \text{ McCarthy 1989 representations of gutturals:} \]
\[
?_h: \text{Phar} \quad \text{?t}_h: \text{Phar} \\
\quad \text{[+ glottal]} \quad \text{[+ glottal]} \\
\]

Pharyngeal place is then added to the hierarchy as the least marked Place:

\[(4) \quad *\text{Dor, } *\text{Lab} >> *\text{Cor} >> *\text{Phar} \]

The result, as we see in (5), is that /?/ will be the optimal epenthetic consonant.

<table>
<thead>
<tr>
<th>/gao/</th>
<th>(Epenthesis)</th>
<th>*Cor</th>
<th>*Phar</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. gato</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. gabo</td>
<td></td>
<td></td>
<td>!*</td>
</tr>
<tr>
<td>c. ga</td>
<td></td>
<td></td>
<td>!*</td>
</tr>
<tr>
<td>d. ga.o</td>
<td></td>
<td></td>
<td>!*</td>
</tr>
</tbody>
</table>

The true Pharyngeals are obviously very marked consonants, but my claim is that this must be due
to something other than their primary Place. Compare for example English /θ/, which manages to be highly marked despite its unmarked Coronal primary place. Some other feature or feature cooccurrence, rather than Place markedness, must account for the markedness of the interdentals and true Pharyngeals; this is unsurprising since there is more than one dimension of markedness.

This proposal allows the correct result that glottal stop is the unmarked epenthetic consonant. It also solves a long-standing problem with the representation of glottal consonants: They have also been claimed to be Placeless, but then how can they pattern with the guttural class in some languages? The only solution in previous work has been that [h,?] have different representations in different languages (e.g. Rose 1996). The markedness approach allows us to account for the ‘unmarked’ behavior in epenthesis, but still represent glottals with a Place feature; thus they can share a place feature with the other gutturals. Thus we have a uniform representation for glottal consonants cross-linguistically.

3. Epenthesis: coronals vs. glottals in a fight to the death
3.1 The data
As we have seen so far, the revised Place markedness constraint predict glottals will be optimal epenthetic consonants. What about the claims for coronal epenthesis? I will show that there are such cases, but they are restricted: we only see them when factors other than Place markedness are active. While glottal stop is lowest marked in Place, constraint conflict will sometimes make it impossible to choose the glottal stop; the next least marked Place, Coronal, will then be seen.

The data I have collected on epenthetic coronals is outlined in (6) and (7).

(6)a. Coda sonorants
Bristol /l/- Word-final after schwa
Boston /r/- (actually ambisyllabic; see McCarthy 1993)
Tunica /n/- phrase-final
b. Onset sonorants
Gokana: /n/ in nasal morphemes, /r/ in oral ones, in restricted enviroment
Japanese /r/ in the verbal paradigm
Fula language game /n/

(7) Obstruents
Amaharic /t/ (details below)
Axininca /t/ in suffixation only
Odawa /t/ with personal prefixes

Some examples of languages with glottal stop epenthesis are given in (8); the list is by no means exhaustive.

(8) Onset glottal stop epenthesis: Malay (Durand 1986), Selayarese (Mithrun and Basri 1986), Ilokano (Hayes and Abad 1988), Czech (Kučera 1961), English, Arabic, Hebrew (Rose 1996), German (Wiese 1996), Kisar (Austronesian; Christensen 1992), Sundanese (Robins 1953), Tamil (Christdas 1988), Gokana, Tunica (see below)....
Coda glottal stop epenthesis is also found. For example, in Cupeño (Crowhurst 1994) it is used to satisfy a minimal word requirement, as seen in (9):

(9)

\[
\begin{array}{l}
/\text{či}/ \quad \text{či}? \quad \text{‘gather’} \\
/hu/ \quad \text{hu}? \quad \text{‘fart’} \\
/kwa/ \quad \text{kwa}? \quad \text{‘eat’} \\
\end{array}
\]

As this will be important for purposes of comparison in the next section, I give tableau (10), which shows that the proposed Place constraints give the correct result here as well.

(10)

<table>
<thead>
<tr>
<th>/hu/</th>
<th>MinWd</th>
<th>*Dor</th>
<th>*Cor</th>
<th>*Phar</th>
</tr>
</thead>
<tbody>
<tr>
<td>hu</td>
<td>!*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hu?</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>hut</td>
<td></td>
<td>!*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hug</td>
<td></td>
<td>!*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Here, the epenthetic consonant is chosen purely by Place markedness, as it is for the onset in tableau 5 above. Similar examples of coda glottal epenthesis are Yucatec Maya /h/ epenthesis in loans to meet requirement that words end in C (Orie and Bricker 1997) and Huariapano /h/ epenthesis to meet requirement that stressed syllables be heavy (Parker 1996) (again, the list is not exhaustive).

3.2. Coda epenthesis and sonorance.

So Place markedness alone predicts that epenthetic consonants would always be glottals, in onset as well as in coda. But as we know that sonorants make good codas, it’s not surprising to find that the requirement for a low-marked Place sometimes conflicts with the need to have a sonorant coda. I claim that in such a case we will see coronal epenthesis, since that’s the least marked Place a sonorant can have. Crucial to this is the assumption that glottal stop is really an obstruent, which I make following a number of authorities, such as Ladefoged 1971, Hyman 1975, Schane 1973, Lass 1976. (See Bessell 1992 for a summary of claims about the major class features of [?,h]).

I now turn to a detailed examination of this class of cases.

**Bristol English**

Bristol English is well known for a rule that inserts /l/ word-finally after a schwa (see for example Hughes and Trudgill 1979, Wells 1982), with the result that words such as “Eva” and “evil” and homophones. This is likely related to the more general English prohibition on word-final short/lax vowels, but for the present purpose I simply assume the constraint in (11).
(11)  *ə]: Word-final schwa is prohibited

As we see in (12), the appropriate ranking with Max and Dep will ensure that epenthesis resolves
the violation of the constraint in (11).

(12)

<table>
<thead>
<tr>
<th>/iə/</th>
<th>*ə</th>
<th>Max</th>
<th>Dep</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. iə</td>
<td>!*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. iəC</td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. iə</td>
<td>!*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I assume (13) as the constraint preferring sonorant codas. As we see in (14), if this is high
ranked, glottal stop epenthesis will be ruled out. A coronal sonorant will be optimal instead.

(13)  SonMora: Moras should be linked to [+son]

(14)

<table>
<thead>
<tr>
<th>/iə/</th>
<th>SonMora</th>
<th>*Cor</th>
<th>*Phar</th>
</tr>
</thead>
<tbody>
<tr>
<td>iə</td>
<td>!*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iəC</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iə?</td>
<td>!*</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Of course, it’s not quite as easy as (14): we still must choose among the different possible coda
sonorants. The details of how to state the relevant constraints are beyond the scope of this paper,
but let’s consider at least the choice between the nasal and nonnasal sonorants, as this will also be
important in the next example. The appropriate ranking of some constraints like those in (15) will
make the correct choice between /l/ and /n/, as in (16).

(15)  *NasMora: Nasal moras are prohibited
      *NonnasMora: Nonnasal moras are prohibited

(16)

<table>
<thead>
<tr>
<th>/iə/</th>
<th>*NasMora</th>
<th>*NonnasMora</th>
</tr>
</thead>
<tbody>
<tr>
<td>iə</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>iəC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iən</td>
<td>!*</td>
<td></td>
</tr>
</tbody>
</table>

These two constraints can’t be universally ranked, as we’ll see in the next example.

**Tunica**

In Tunica we see epenthesis of /n/ phrase finally. According to Haas (1940), phrase-final words
are special in various ways including their tone and stress, but what will concern us here is only the requirement that they end in a consonant. A limited number of vowel-final words form their phrase-final forms by vowel deletion, but in most cases the phrase-final form is formed by the insertion of /n/:

(17) regular form  phrase-final form  (Tone omitted)
hatika  hatikan  "again"
sahku  sahkon  "one"

I assume the constraint in (18) as the requirement driving epenthesis; (19) shows its ranking with Max and Dep.

(18) Phrase-FinalC: Phrases should end in a consonant.

<table>
<thead>
<tr>
<th>/sahku/</th>
<th>Phrase-finalC</th>
<th>Max</th>
<th>Dep</th>
</tr>
</thead>
<tbody>
<tr>
<td>sahku</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sahkuC</td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>sahku</td>
<td>*!</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The ranking of the nasal mora constraints proposed in (15) must be opposite of what they are in Bristol English, since we want the nasal consonant to be optimal:

(20)

<table>
<thead>
<tr>
<th>/sahku/</th>
<th>*NonnasM</th>
<th>*NasalM</th>
<th>*Lab</th>
<th>*Cor</th>
<th>*Phar</th>
</tr>
</thead>
<tbody>
<tr>
<td>sahku?</td>
<td>!*</td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>sahku</td>
<td>*</td>
<td></td>
<td></td>
<td>*</td>
<td>!*</td>
</tr>
<tr>
<td>sahkun</td>
<td>*</td>
<td></td>
<td></td>
<td>!*</td>
<td></td>
</tr>
</tbody>
</table>

Although the Place constraints are active above in choosing /n/ over /m/, they must be lower ranked than the constraints on the nasality of moras which force the choice of a sonorant:

(21)

<table>
<thead>
<tr>
<th>/sahku/</th>
<th>*Cor</th>
<th>*Phar</th>
<th>*NonnasM</th>
</tr>
</thead>
<tbody>
<tr>
<td>sahku?</td>
<td>*</td>
<td></td>
<td>!*</td>
</tr>
<tr>
<td>sahku</td>
<td>!*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thus, both Tunica shows the situation I predict to hold: that coronals are only epenthetic when something conflicted is more important than Place markedness. In this case, the conflicting constraints are those that regulate other featural qualities of the coda, sonorance and nasality.

An interesting fact about Tunica is that it also shows epenthetic glottal stop in the construction of these phrase-final forms. Certain kinds of words with final stress must add a prothetic final syllable in order to be able to take epenthetic final /n/. This added syllable has glottal stop onset and a copy vowel, and /n/ in the coda:

<table>
<thead>
<tr>
<th>Regular form</th>
<th>Phrase-final form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>ri</td>
<td>ri?in</td>
<td>house</td>
</tr>
<tr>
<td>ke</td>
<td>ke?en</td>
<td>wasp</td>
</tr>
<tr>
<td>ru</td>
<td>ru?un</td>
<td>hickory</td>
</tr>
<tr>
<td>?arupo</td>
<td>?arupo?on</td>
<td>dream</td>
</tr>
</tbody>
</table>

Thus we see within a single language, even a single form, the different effects of markedness in onset and coda. Because the onset is not subject to a requirement of high sonority, the least marked Place, Phar, is optimal. But in the coda, which must be sonorant, the best we can do is coronal.

**Boston English**

My third case of coda coronal epenthesis, Boston [r], is analyzed in an early OT paper by McCarthy (1993). McCarthy does not account for why the particular segment [r] is chosen as epenthetic, but he shows that the constraint Final-C, demanding that a word end in a consonant, is crucial to the environment of epenthesis. Although the consonant is ambisyllabic, it is at least partly in coda position, so the coda sonorance requirement may be relevant. Gnanadesikan (1997) suggests that the explanation for [r] may be that it is the pharyngealized glide, agreeing with the features of the adjacent Pharyngeal vowel [a]; she notes that [w] and [y] occur in the same position with the [-low] back and front vowels respectively, also showing feature agreement. However, many unrelated problems remain to be solved with this case. The dialect has a complicated interaction of both [r] epenthesis and [r] deletion, and until this relationship is understood it is impossible to be sure what is special about [r] here.

**4. Coronal sonorant epenthesis - onsets**

In onset position, sonorants are not preferable; obstruents presumably are because of the steeper sonority cline they give to the syllable. So the explanation for coronals instead of glottals in cases of onset epenthesis must be different. All of the case of onset coronal sonorants epenthesis that I have found are restricted to particular morphological situations; they are never the general epenthetic consonant of the language.

I will not give detailed analyses of these cases. I assume that in many of them, the analysis will involve faithfulness constraints relativized to particular morphological domains; this is how McCarthy and Prince (1995) account for processes specific to reduplication, and see Benua (1995) for an extension of this approach to other morphological domains. A few are sufficiently restricted (to one morpheme or a small handful) that a representational solution, such as a ghost
consonant, may be appropriate. However, the details of how to analyze these morphological restrictions in OT is clearly outside the scope of this paper. I will confine myself to arguing that there is a significant empirical generalization here. There is no language where the general, phonologically driven epenthetic consonant is a coronal; in all of them the story is more complicated, confirming the generalization that coronal epenthesis is only seen when something additional to Place markedness is active.

**Gokana**

In restricted circumstances, Gokana (Hyman 1985, 1982) has epenthesis of the segment Hyman calls underlying /l/. This is realized as [r] intervocally in an oral context and as [n] in a nasal context, as seen in the following examples (tone omitted):

(23) **Second person plural:**
- oo tu-i ‘you pl. took’
- oo zov-ii ‘you pl. danced’
- oo sii-rii ‘you pl. caught’

(24) **Logophoric:**
- oo-tu-e ‘he took’
- oo-zov-ee ‘he danced’
- oo sii-ree ‘he caught’

This type of epenthesis is found only with these two suffixes, the second person plural subject and the Logophoric, and under Hyman’s analysis has additional phonological restrictions as well. There are two restrictions:

One, it only applies between two long vowels. After a short vowel, long vowels shorten instead, as we see from the /II/ suffix in the following:

(25) oo-k **-i** ‘you pl. woke (it) up’ (Hyman 1982:(15b))

Two, this type of epenthesis only applies within a particular morphological domain. Hyman calls it a “foot,” but is clear that it’s meant to be a morphological constituent:

(26) **Hyman’s (33) Gokana “foot” structure:**
Root+grade suffix+ derivational suffix+ inflectional suffix

Object clitics and other morphemes that follow these suffixes are excluded from this structure, which is also the relevant domain for certain tonal phenomena, unlike vowel harmony and nasalization which extend over the whole phonological word. Again, outside this domain there is shortening instead of epenthesis:

(27) bae-div-ee ‘they hit him’
    bae-sii-e ‘they caught him’ (Hyman 1982:(9))
Apparently, then, two long vowels in a row are forbidden in all circumstances, but violations of this constraint are resolved in different ways in different situations. What is important for present purposes is that the epenthetic coronal is restricted only to a particular morphological domain; it’s not the general phonologically-driven epenthetic consonant of the language. In fact, Gokana also has glottal stop epenthesis occurs word-initially, where only syllable structure involved and the additional morphological and phonological conditioning of the coronal sonorant epenthesis rule is absent.

Japanese
In the verbal paradigm, Japanese has several endings that alternate between /r/ and zero:

<table>
<thead>
<tr>
<th>(29)</th>
<th>C-final stems</th>
<th>V-final stems</th>
</tr>
</thead>
<tbody>
<tr>
<td>pres.</td>
<td>das-u ‘put out’</td>
<td>habe-ru ‘eat’</td>
</tr>
<tr>
<td>prov.</td>
<td>das-eba</td>
<td>habe-reba</td>
</tr>
<tr>
<td>pass.</td>
<td>das-areru</td>
<td>habe-rareru</td>
</tr>
</tbody>
</table>

It is controversial whether this is deletion (Poser 1986, McCawley 1968) or epenthesis (Mester and Ito 1989, de Chene 1985). deChene, the most detailed study arguing for epenthesis, partly bases this on evidence from the results of an experiment using nonsense verbs. De Chene writes a rule that is morphologically restricted: it is stipulated to apply at a verb stem boundary only. We can see this in the following example which has both verb stem and adjective stem boundaries.

(30) [[[mi] vsare][vsna][as]]a → mirarenai ‘won’t be seen’

If this alternation is actually deletion, of course, then it is irrelevant for my purposes. But if the controversy is resolved in favor of epenthesis, this case also fits the prediction: the epenthetic coronal is only seen in a restricted situation.

Fula
Bagemihl (1989): /n/ is a default epenthetic consonant in a language game in Fula. This game normally reverses the first two consonants in a word:

(31)  saare raase ‘concession’
      war raw ‘comes’
      ?umara mu?aru a proper name

However, when the first two consonants are identical, the second is replaced by /n/:

(32)  baaba baana ‘father’
      daada daana mother
      jaaje jaane a proper name

This appears to be the only situation where epenthetic /n/ appears in the language. However we want to take into account language games in constructing our theory of phonology, it is clear that
It is unclear whether we should expect to see markedness constraints reflected in the same way in language games as in natural languages; for example, do they actually tend to use unmarked consonants in epenthesis? Perhaps not; Stuart Davis (p.c.) points out that some language games use labials, for instance, and we probably don’t want to use this to argue that the Place markedness hierarchy should be revised. There are surely functional reasons that language games might want to use more marked consonants deliberately, to mark the language game situation (and of course, because labials are just funnier than other consonants.)

5. /t/ epenthesis
As we have seen so far, then, there are indeed some languages where we see epenthesis of a coronal rather than a glottal, but these are always sonorants; because of some kind of high-ranked pressure to choose a sonorant, the least marked epenthetic segment possible will be a coronal.

However, a few languages do have epenthetic /t/, including Axininca, which is the case usually cited to support the existence of coronal epenthesis. I now turn to these cases. These also show morphological restrictions, although I will also discuss some relevant phonological considerations.

Axininca
Axininca Campa (Payne 1981) has a complicated pattern of epenthesis related to a variety of prosodic morphological requirements, as shown in the OT analysis of McCarthy and Prince 1993. The epenthetic /t/ is always in onset position, and at least part of the motivation for its presence is the Onset constraint. The following examples show some of the simplest cases. (McCarthy and Prince 1993; Payne 1981:108.)

(33) I-N-koma-i  iŋkomati ‘he will paddle’
i-N-koma-aa-i iŋkomataati ‘he will paddle again’

Morphological considerations are crucial to where this epenthesis occurs, as McCarthy and Prince show in detail. The most straightforward part of the restriction is that this is found only with suffixation, not prefixation; hiatus in prefixation is resolved by deletion. In this sense, it’s clear that this case fits in with the earlier cases where coronals are epenthetic only in morphologically restricted cases.

However, there are also some crucial phonological considerations. One central one is the fact that apparently Axininca simply doesn’t have /ʔ/ in its inventory. This will clearly require it to resort to some other relatively unmarked consonant, roughly as in (34) (where *ʔ stands for the constraint ruling out glottal stop.)

---

2It is unclear whether we should expect to see markedness constraints reflected in the same way in language games as in natural languages; for example, do they actually tend to use unmarked consonants in epenthesis? Perhaps not; Stuart Davis (p.c.) points out that some language games use labials, for instance, and we probably don’t want to use this to argue that the Place markedness hierarchy should be revised. There are surely functional reasons that language games might want to use more marked consonants deliberately, to mark the language game situation (and of course, because labials are just funnier than other consonants.)
However, Axininca does have /h/, which has the unmarked Phar place. Something else must be going on, or we make the incorrect prediction that /h/ will be epenthetic:

This seems likely to have to do with the markedness of different sonority clines for onsets, so that a stop is a better onset than a fricative. In fact this kind of requirement is necessary in any case, since we need to explain how /t/ is chosen over other Coronals, such as /s/. Assume the following constraints to stand for the sonority cline requirements:

(36) Some sonority cline constraints:
*FricV: Prohibits fricative onset
*StopV: Prohibits stop onset
   Universal ranking *FricV >> *StopV
*SonV: Prohibits sonorant onset
*ObsV: Prohibits obstruent onset
   Universal ranking *SonV >> *ObsV

As we see in (37), these constraints will correctly choose /t/ over the other coronals; they will also force the epenthetic consonant to be Coronal rather than less marked Pharyngeal place, since the only available glottal consonant is a fricative and so is ruled out by the higher ranked sonority constraint *FricV.
Thus, again we see that a coronal consonant will only be epenthetic when conflicting higher ranked constraints prevent the choice of the glottal consonants with their lower marked Place feature.

### Amharic

Broselow (1984) argues that Amharic uses /t/ as a default consonant in several situations. In one case, /t/ is argued to be used to fill the last template position in the roots in (a). This is to explain their difference from the roots in (b), which Broselow argues are actually roots with underlying identical consonants, acting identically to the triconsonantal root in (c). Note that not all template positions are obligatory - we see the epenthetic /t/ in the gerund and infinitive of (a), but not in the final slot of the perfective.

(38) (a) /fj/ ‘consume’ (b) /wdd/ ‘like’ (c) /lbs/ ‘open’

- fäjjä wäddädä läbbäsä perfective
- fäjto wäddo läbso gerund
- mäfjät mäwdäd mälbäs infinitive

Broselow also argues for /t/ epenthesis to explain the variation in the passive-reflexive, which is indicated by [tä] in the perfect, but by gemination of the first root consonant in the infinitive:

(39) perfect: tä-läbbäsä infinitive: mä-lläbäs ‘be dressed’

(Tigrinya shows the same variation in this prefix, see Kenstowicz 1982.)

Finally, there are certain verbal suffixes that appear as [u] after a consonant, [w] after a vowel, but [t] after [u,o]. This is driven by a prohibition on a round vowel-[w] sequence in a syllable rime.

(40) masc. object clitic: läbsa ‘her having dressed’
- läbsa-w ‘her having dressed him’
- läbso ‘his having dressed’
- läbso-t ‘his having dressed him’
As is clear from the descriptions, these are not simply cases of syllable-structure-driven epenthesis. Broselow’s analysis is that the /t/ occurs in all of these situations because it is the default consonant of the language. These assumptions would have to be rethought in an OT analysis. For the present purpose, it seems clear that these cases all fit into the generalization I propose, as all cases of /t/-epenthesis are morphologically specific. Only certain templates demand the /t/ to fill an empty slot, and the other two cases are specific to certain morphemes. A ghost-consonant analysis could be the correct way to go in this case; Broselow points out that the epenthetic /t/ developed historically from a morpheme - perhaps this morpheme developed into floating features associated with certain morphemes in the current language.

A final point about Amharic is that not only is /t/ not the general epenthetic consonant of the language, but also there does appear to be syllable-driven /ʔ/ epenthesis (although this has been argued to be phonetic (Hudson 1982), and is not the only possible response to hiatus (Leslau, p.7)).

**Odawa**

In Odawa (Ojibwa; Piggott 1990) there is /t/ epenthesis at the boundary between a personal prefix and a stem: (Omitted are the result of additional rules deleting vowels.)

(41) /ki-akat-i/ kitakači ‘you are shy’  
/ki-osämikwäm-m/ kitosämikwämim ‘you pl.oversleep’  
/ni-ompass/ nitömpass ‘my bus’

In other situations hiatus is resolved by deletion: note the constrast when the same prefix is attached to a different class of nouns, those of inalienable possession (42); (some deletion is variable, (43b)):  
(42) /ni-ōss/ nōss ‘my father’
(43a. /okimā-ak/ okimāk ‘chiefs’  
/okkkwē-ak/ okkkwēk ‘maggots’

b. /kī-pi-išā-w/ kīpišā ~ kīpišā ‘he came hither’

As in most of the cases of coronal epenthesis in onset, then, this is clearly morphologically restricted. Here, as in Amharic, since only a handful of morphemes are involved, a ghost consonant or floating features seems like a possible analysis, unlike cases like Gokana and Japanese where all morphemes within a particular domain are affected.

To sum up, then, we have seen that in all cases where epenthetic /t/ is attested, it is never the general epenthetic consonant of the language. We often see glottal stop epenthesis throughout a language to satisfy purely phonological requirements such as Onset; we do not seem to see similar cases of /t/ epenthesis. All of these cases are restricted morphologically, and as in Axininca may also be the result of additional conflicting phonological constraints. Although all of the cases obviously need individual in-depth analyses that I have not provided, it is clear that they do not provide evidence that /t/ is commonly used for general syllable-driven epenthesis.
6. Conclusion
I have shown that on the basis of evidence from epenthesis, the Place markedness hierarchy of Prince and Smolensky (1993), Smolensky (1993) should be modified to include Pharyngeal as the least marked place. This will give glottal stop as the optimal epenthetic consonant, all things being equal. However, all things aren’t always equal: constraints conflict, so it may not always be possible to perfectly satisfy the markedness constraints. In such cases a coronal may be chosen as epenthetic, since coronals still have a relatively unmarked Place. As evidence for the claim that coronals are only chosen for epenthesis in such cases of constraint conflict, I have shown that coronal epenthesis is always somehow restricted. In coda, coronal epenthesis may occur due to the phonological preference for sonorant codas. In onset we see that there are also always additional restrictions, usually morphological, on coronal epenthesis. The coronal is never the general phonological epenthetic onset in the languages cited, many of which also have glottal stop epenthesis outside the specific situation where a coronal is required.

Appendix: A related issue in coda sonorant markedness: Anusvara/angma epenthesis
As Trigo (1988) has shown, in many cases /ŋ/ seems to be the unmarked coda nasal. We can see this in cases of coda epenthesis, as well as coda neutralization. For example, the only syllable-final consonants in Buginese (Austronesian; Mills 1975) are /ŋ/, with doubly linked geminates and NC clusters escaping the coda condition. Epenthesis in loans words to meet the minimal word requirement is seen in the following example:

“tea” *te, teŋ (p53.)

A similar case is seen in Kaingang (Brazil), where Yip (1992) argues that /ŋ/ is inserted in reduplication to meet a weight requirement.

Trigo argues that the velar nasal in cases like this is actually a placeless nasal glide. As we have seen in this paper, similar arguments for Placelessness can be reanalyzed as a result of the ranked markedness constraints. The good thing about this approach is that it’s less all-or-nothing than underspecification: we can make more subtle distinctions. That’s clearly necessary here. However, further work is required to determine exactly how to handle this type of case. It seems unlikely that it’s simply the that Place hierarchy is different for nasals, e.g. *Cor >> *Dor; note for example that while in many languages angma is unmarked in codas, others (like English) suggest that it is marked in onset. A Place hierarchy specific to codas may be needed. Another possible approach may be to retain Trigo’s assumption that this segment is a glide. If this segment is more sonorous than the [+cons] nasals, it may sometimes be a preferable coda, when markedness of coda sonorance is more important than markedness of Place, roughly:

<table>
<thead>
<tr>
<th>/pǐ/</th>
<th>WMin</th>
<th>GlideMora</th>
<th>*Dor</th>
<th>*Cor</th>
</tr>
</thead>
<tbody>
<tr>
<td>pǐ</td>
<td>*!</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>pin</td>
<td></td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>kɛ̃pɨŋ</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Presumably we’d see /n/ instead when GlideMora and place markedness are reranked, or in
languages that simply don’t have the nasal glide in their inventory. But more research is needed. For example, in some of these language there’s nothing in the published descriptions to suggest that angma is a glide; Frederick Parkinson (p.c.) who has heard Buginese spoken, informs me that it does not seem to be a glide in that language, for example.

Bibliography


Christdas, Prathima. 1988. The phonology and morphology of Tamil. Cornell PhD.


Haas, Mary R. 1940. Tunica. Extract from Handbook of American Indian Languages vol.IV.


Hudson, G. 1982. Review of Bender and Fulass, Amharic Verb Morphology, Afroasiatic Linguistics 8, 3-9


Payne, David L. 1981. The phonology and morphology of Axininca Campa. Summer
Institute of Linguistics, University of Texas at Austin.


Zoll, Cheryl. 1996. Parsing below the segment in a constraint based framework. PhD dissertation, University of California, Berkeley